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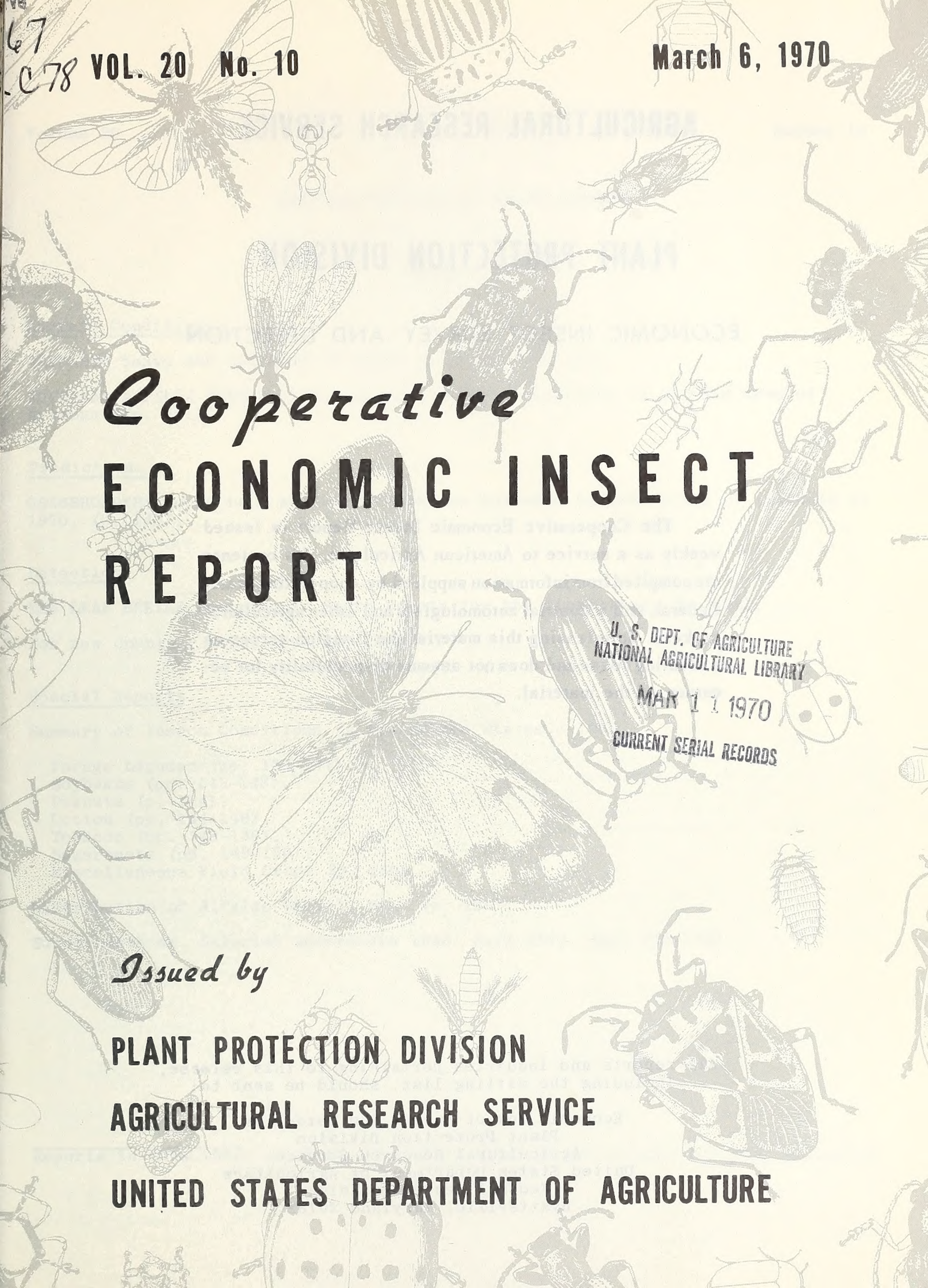

Cooperative ECONOMIC INSECT REPORT

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PLANT PROTECTION DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

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ECONOMIC INSECT SURVEY AND DETECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Economic Insect Survey and Detection
Plant Protection Division
Agricultural Research Service
United States Department of Agriculture
Federal Center Building
Hyattsville, Maryland 20782

Volume 20 March 6, 1970 Number 10

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

GREENBUG heavy and damaging to wheat in Texas. (p. 131).

EGYPTIAN ALFALFA WEEVIL larvae damaged alfalfa terminals in limited area of Arizona. (p. 131).

Predictions

GRASSHOPPERS could be a serious problem on soybeans in some areas of Illinois in 1970. (p. 143).

Detection

ELM LEAF BEETLE reported in South Dakota for the first time. (p. 132).

For new county records see page 134.

Special Reports

Summary of Insect Conditions in the United States - 1969

- Forage Legumes (pp. 135-141).
- Soybeans (pp. 142-143).
- Peanuts (p. 144).
- Cotton (pp. 144-148).
- Tobacco (pp. 148-149).
- Sugarbeets (pp. 149-150).
- Miscellaneous Field Crops (p. 150).

Distribution of Alfalfa Weevil. Map. (p. 136).

Survey Methods. Selected References 1945. Part XXVI. (pp. 151-152).

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WEATHER BUREAU'S 30-DAY OUTLOOK

MARCH 1970

The Weather Bureau's 30-day outlook for March is for temperatures to average below seasonal normals in the Pacific Northwest, as well as the Northeast and the remainder of the northern border States. Above normal temperatures are expected in the Southwest while near normal averages are indicated in unspecified areas. Precipitation is expected to exceed normal over the Pacific Northwest and the northern Plains. Subnormal totals are in prospect for the southern Plains, the west gulf coast and New England. Elsewhere near normal precipitation is indicated.

Weather forecast given here is based on the official 30-day "Resume and Outlook" published twice a month by the Weather Bureau. You can subscribe through the Superintendent of Documents, Washington, D.C. 20250. Price $5.00 a year.

WEATHER OF THE WEEK ENDING MARCH 2

HIGHLIGHTS: Generous rains fell in eastern Texas with light to moderate rains across the Deep South. A weekend storm brought rain to southern California and rain and snow to Arizona. Temperatures were generally above normal over the western and central United States and below normal over the eastern third.

PRECIPITATION: Sunny, pleasant weather prevailed over most of the Nation early in the week. An exception was eastern Texas where generous rains caused many streams to rise to or near their flood stages. The northern plains of Texas continued dry as did wide areas from the Great Basin, the central Rocky Mountains and the northern and central Great Plains. Even the State of Washington received only spotty precipitation during the week. Midweek rains brought 0.50 inch to 1.50 inches of moisture to the Deep South from Louisiana

Weather of the week continued on page 134.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

GREENBUG (Schizaphis graminum) - ARIZONA - Light in wheat and barley in Maricopa and Yuma Counties. Ranged 5-16 per linear foot in 5 fields at Somerton. No winged females observed. (Ariz. Coop. Sur.). NEW MEXICO - Light on barley in Chaves County. (Mathews). OKLAHOMA - Ranged 50-90 per linear foot in wheat in many fields and 150-200 per linear foot in scattered fields in Tillman, Jackson, and Harmon Counties. Heaviest counts in scattered areas of Tillman County and Elmer area of Jackson County. Moderate in Kingfisher County and light in Payne County. (Okla. Coop. Sur.). TEXAS - Ranged 1-400 per linear foot on wheat in 18 panhandle counties February 13, 16, and 17. Highest count 400 per linear foot in Briscoe County and lowest, 1 per linear foot in Potter and Wheeler Counties. Braconids noted in most fields. (Daniels). Heavy in fields in Hardeman, Motley, Wilbarger, Jones, and Foard Counties. Controls applied in some fields. Infestations moderate in Knox, Young, and Childress Counties. (Boring). Medium but widespread and damaging wheat in Karnes County. Ranged 10-200 per row foot. Injurious only to late-planted wheat. (McNally). Medium locally on dryland wheat near Batesville, Zavala County; wheat 4-6 inches high. Greenbug ranged 30-50 per plant. (Gardner).

CORN, SORGHUM, SUGARCANE

SOUTHWESTERN CORN BORER (Diatraea grandiosella) - MISSOURI - Surveys in 2 fields in Scott County in September 1969 indicated live larvae in 93 percent of stalks. Current infestation averaged 0.6 percent in 300 stalks in same fields. (Munson).

SMALL GRAINS

WINTER GRAIN MITE (Penthaleus major) - TEXAS - Light to moderate in Young and Jones Counties. Locally heavy in 1 wheatfield near Hillsboro, Hill County. (Boring, Hoermann, Feb. 20). OKLAHOMA - Averaged 75 per linear foot in wheatfield in Eldorado area of Jackson County. Light in Tillman and Harmon Counties. (Okla. Coop. Sur.).

FORAGE LEGUMES

EGYPTIAN ALFALFA WEEVIL (Hypera brunneipennis) - ARIZONA - Larvae averaged 500 per sweep and damaged terminals of alfalfa at Dome, Yuma County. (Ariz. Coop. Sur.).

ALFALFA WEEVIL (Hypera postica) - MISSISSIPPI - Larvae averaged 7.4 per 20 stems of alfalfa in Pontotoc County. (Pitre).

PEA APHID (Acyrthosiphon pisum) - ARIZONA - Averaged 1,000 per 100 sweeps of alfalfa at Dome Valley, Yuma County. (Ariz. Coop. Sur.). NEW MEXICO - Light on alfalfa in southern areas. (N.M. Coop. Rpt.). OKLAHOMA - Light (3-4 per square foot of crown) in alfalfa in Payne County. (Okla. Coop. Sur.).

POTATOES, TOMATOES, PEPPERS

POTATO TUBERWORM (Phthorimaea operculella) - ALABAMA - Larvae heavy and damaging on 200 tomato plants in greenhouse in Mobile County. Controls applied. (Leeper, et al.).

COLE CROPS

FORK-TAILED BUSH KATYDID (Scudderia furcata) - CALIFORNIA - Medium on cabbage at Vista, San Diego County. (Cal. Coop. Rpt.).

DECIDUOUS FRUITS AND NUTS

ROUNDHEADED APPLE TREE BORER (Saperda candida) - IDAHO - Severe in commercial apple orchard at Weiser, Washington County. (Horn, Feb. 24).

OTHER TROP. & SUBTROP. FRUITS

AN ANOBIID BEETLE (Ozognathus cornutus) - CALIFORNIA - Larvae and adults light in macadamia nuts at Vista, San Diego County, February 9. Determined by F. Andrews; confirmed by R.E. White. First known report of this species infesting macadamia nuts. (Cal. Coop. Rpt.).

CITRUS

AN ARMORED SCALE (Unaspis citri) - FLORIDA - All stages moderate on stems of 60 percent of 1,200 nursery plants at Zellwood, and moderate on bark of half of 1,000 trees in grove at Plymouth, Orange County. (Speaker, Feb. 20).

CITRUS RED MITE (Panonychus citri) - FLORIDA - All stages moderate on leaves of 75 percent of 300 Calamondin at nursery in Miami, Dade County. (McHenry, Feb. 4). ARIZONA - None found in survey of old citrus tree planting at Dateland, Yuma County. (Ariz. Coop. Sur.).

ORNAMENTALS

DOGWOOD BORER (Thamnosphecia scitula) - ALABAMA - Larvae feeding on cambium layer of numerous dogwoods along streets and on lawns in Lee County. Many larvae destroyed by birds. (McQueen).

A PYRALID MOTH (Herculia phaezalis) - CALIFORNIA - Larval counts 3 per limb on Italian cypress at Artesia, Los Angeles County. (Cal. Coop. Rpt.).

A SNAIL (Rumina decollata) - ARIZONA - Heavy around many residences in Salt River Valley, Maricopa County. (Ariz. Coop. Sur.).

FOREST AND SHADE TREES

SILVER-SPOTTED TIGER MOTH (Halisidota argentata) - OREGON - Third instar damage light to pines in nursery at Newport, Lincoln County. (Wheeler).

ELM LEAF BEETLE (Pyrrhalta luteola) - SOUTH DAKOTA - Larvae collected at Yankton, Yankton County, by M.L. Briones August 20, 1969. Determined by E.U. Balsbaugh. This is a new State record. (Jones).

MAN AND ANIMALS

SCREW-WORM (Cochliomyia hominivorax) - No cases reported in U.S. February 22-28. Total of 29 laboratory-confirmed cases reported in portion of Barrier Zone in Republic of Mexico February 15-21 as follows: Sonora 21, Chihuahua 8. Total of 4 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operation underway to prevent establishment of self-sustaining population in U.S. Sterile screw-worm flies released: Texas 168,000; Mexico 104,550,000. (Anim. Health Div.).

COMMON CATTLE GRUB (Hypoderma lineatum) - TENNESSEE - Infested 26 of 31 head of cattle, averaged 5.4 per head, in Giles County. (Parker, Edwards). OKLAHOMA - Remains moderate in backs of cattle in Mayes County. (Okla. Coop. Sur.).

BROWN RECLUSE SPIDER (Loxosceles reclusa) - TENNESSEE - Collected in Chester and Henry Counties. These are new county records. (Johnson). TEXAS - Specimen collected at Brashear, Hopkins County. (Coster). This is a new county record. (PPD).

HOUSEHOLDS AND STRUCTURES

EASTERN SUBTERRANEAN TERMITE (*Reticulitermes flavipes*) - MARYLAND - Swarming increasing throughout State. (U. Md., Ent. Dept.).

STORED PRODUCTS

A DERMESTID (*Trogoderma variabile*) - CALIFORNIA - Larvae heavy in onion seed at seed company in El Centro, Imperial County. (Cal. Coop. Rpt.).

BENEFICIAL INSECTS

AN ICHNEUMON WASP (*Bathyplectes curculionis*) - MISSOURI - Cocoons collected by Huggans, Hanning, and Munson in Bollinger, Cape Girardeau, Crawford, Franklin, Gasconade, Iron, Jefferson, Madison, Perry, Phelps, Ralls, Scott, St. Charles, St. Francois, Ste. Genevieve, St. Louis, and Washington Counties. These are new county records. (Munson).

FEDERAL AND STATE PLANT PROTECTION PROGRAMS

BROWN-TAIL MOTH (*Nygmia phaeorrhoea*) - Survey revealed medium infestation on Cousins Island in Casco Bay, MAINE. Infestations on mainland light and scattered. Survey results negative in MASSACHUSETTS, RHODE ISLAND, and NEW HAMPSHIRE. (PPD East. Reg., Jan.).

CARIBBEAN FRUIT FLY (*Anastrepha suspensa*) - FLORIDA - Adults taken in McPhail in navel orange tree at Melbourne, Brevard County. (Levan, Feb. 17).

CITRUS BLACKFLY (*Aleurocanthus woglumi*) - MEXICO - Chemical Control Zone - Found in 3,084 of 29,835 citrus trees inspected in 4 municipios of Nuevo Leon. Inspected 1,125 trees in 2 municipios of Tamaulipas. In Reynosa, Tamaulipas, 5 trees infested. In Sonora, Baja California, survey negative. (PPD Mex. Reg., Jan.).

GIANT AFRICAN SNAIL (*Achatina fulica*) - FLORIDA - Infestation continues with 3 live snails found in dump at Opa-locka, Dade County. (PPD).

IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) - TEXAS - Specimens collected at Bryan, Brazos County, by O. Barham, February 13. Determined by V.H. Owens, confirmed by D.R. Smith. This is a new county record. (PPD). Light in pastures and roadsides near Anderson, Grimes County. (Barham). FLORIDA - All stages found at Cleremont, Lake County. (Henderson, Feb. 20).

MEXICAN FRUIT FLY (*Anastrepha ludens*) - MEXICO - Survey in Tijuana, Ensenada, and Tecate, Baja California, negative. At La Paz, Territorio sur de Baja California, neither flies nor larvae found. (PPD Mex. Reg., Jan.).

SWEETPOTATO WEEVIL (*Cylas formicarius elegantulus*) - MISSISSIPPI - Adult collected on farm at Enterprise, Clarke County, by J.H. Harris, January 26. Determined by V.H. Owens, confirmed by R.E. Warner. This is a new county record. (PPD).

CORRECTIONS

CEIR 19(Index):21 - Stegasta bosquella (red-necked peanutworm) should read Stegasta bosqueella (red-necked peanutworm).

CEIR 20(8):92 - Lines 2 and 3 should read: ... Heavy infestations of Japanese beetle were reported in Butler County, *OHIO* ...

CEIR 20(9):114 - TOMATO HORNWORM (Manduca quadrimaculata) should read TOMATO HORNWORM (Manduca *quinquemaculata*).

CEIR 20(9):126 - C. toparius should read *CRANBERRY GIRDLER* (C. topiarius).

HAWAII INSECT REPORT

Corn - All stages of CORN PLANTHOPPER (*Peregrinus maidis*) heavy under leaf sheaths in 0.75 acre of sweet corn at Halawa, Oahu. Many plants affected by corn mosaic. Adults and nymphs of CANE LEAFHOPPER EGG SUCKER (*Tytthus mundulus*) abundant in this planting. Adults of *P. maidis* trace (1 per 5 plants) in 20 acres of corn at Kihei, Maui. (Funasaki, Miyahira). Adults of A SAP BEETLE (*Carpophilus humeralis*) and DRIED-FRUIT BEETLE (*C. hemipterus*) heavy on tassels of sweet corn at Halawa. (Kawamura).

General Vegetables - DIAMONDBACK MOTH (*Plutella xylostella*) larvae light (1 per leaf) in small planting of daikon (*Raphanus sativus longipinnatus*) at Pearl City, Oahu. SWEETPOTATO VINE BORER (*Omphisa anastomosalis*) larvae generally light in sweetpotato fields at Waimanalo and Waiahole, Infestation confined mostly to older vines; nil in tubers. (Suzukawa, Funasaki). CARMINE SPIDER MITE (*Tetranychus cinnabarinus*) moderate to eggplant and yardlongbeans at Pearl City; light to medium in snap bean fields at Waianae and Waimanalo. (Kawamura).

Nuts - Colonies of COCONUT SCALE (*Aspidiotus destructor*) light to moderate on banana in some windward fields on Oahu; remain light on papaya at Koko Head and windward areas. (Funasaki).

Ornamentals - Adults and larvae of ORCHID WEEVIL (*Orchidophilus aterrimus*) heavy and causing severe damage to backyard dendrobium orchids at Ainakoa, Oahu; light on similar host at Aina Haina. (Kawamura).

DETECTION

New State Record - ELM LEAF BEETLE (*Pyrrhalta luteola*) - SOUTH DAKOTA - Yankton County (p. 132).

New County Records - ALFALFA WEEVIL (*Hypera postica*) MICHIGAN - Clare, Huron, Isabella, Lake, Mason, Mecosta, Midland, Montcalm, Oceana, Saginaw, Sanilac, and Tuscola (pp. 136, 137). BROWN RECLUSE SPIDER (*Loxosceles reclusa*) TENNESSEE - Chester and Henry; TEXAS - Hopkins (p. 132). AN ICHNEUMON WASP (*Bathyplectes curculionis*) MISSOURI - Bollinger, Cape Girardeau, Crawford, Franklin, Gasconade, Iron, Jefferson, Madison, Perry, Phelps, Rals, Scott. St. Charles, St. Francois, Ste. Genevieve, St. Louis, and Washington (p. 133). IMPORTED FIRE ANT (*Solenopsis saevissima richteri*) TEXAS - Brazos (p. 133). SWEETPOTATO WEEVIL (*Cylas formicarius elegantulus*) MISSISSIPPI - Clarke (p. 133).

Weather continued from page 130.

to the Carolinas. Little rain fell in the Florida Peninsula. As the weekend approached, snow began in the northern Rockies and across the northern Great Plains and the Great Lakes Region to the northern Appalachians. Freezing rain slicked the highways in parts of Nebraska, Minnesota, and Iowa and rain fell from the Ohio River Valley to the western portion of the gulf coast. The weekend brought light to moderate rain to southern California and Arizona. Snow fell in Arizona above 7,000 feet on Saturday and above 5,000 feet by Sunday night. About 1.5 feet of snow fell at Flagstaff in 24 hours.

TEMPERATURE: Mostly pleasant temperatures prevailed over most of the Nation last week. Temperatures averaged above normal over the western two-thirds of the Nation. Parts of the central Rocky Mountains and the northern Great Plains averaged 6° to 12° warmer than normal. It was the seventh consecutive week with warmer-than-normal temperatures from the Pacific coast to the western slopes of the Rockies. Temperatures over the eastern third of the Nation averaged below normal. The mild temperatures early and late in the week were not sufficient to offset the cold midweek when subfreezing temperatures occurred along the gulf coast and frost occurred in northern and central Florida. Quick warming followed the cold temperatures in the Deep South. At Macon, Georgia, the mercury climbed from 28° on Friday morning to 76° by Sunday afternoon. (Summary supplied by Environmental Data Service, ESSA.)

SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1969

(Continued from page 128)

FORAGE LEGUMES

Highlights:

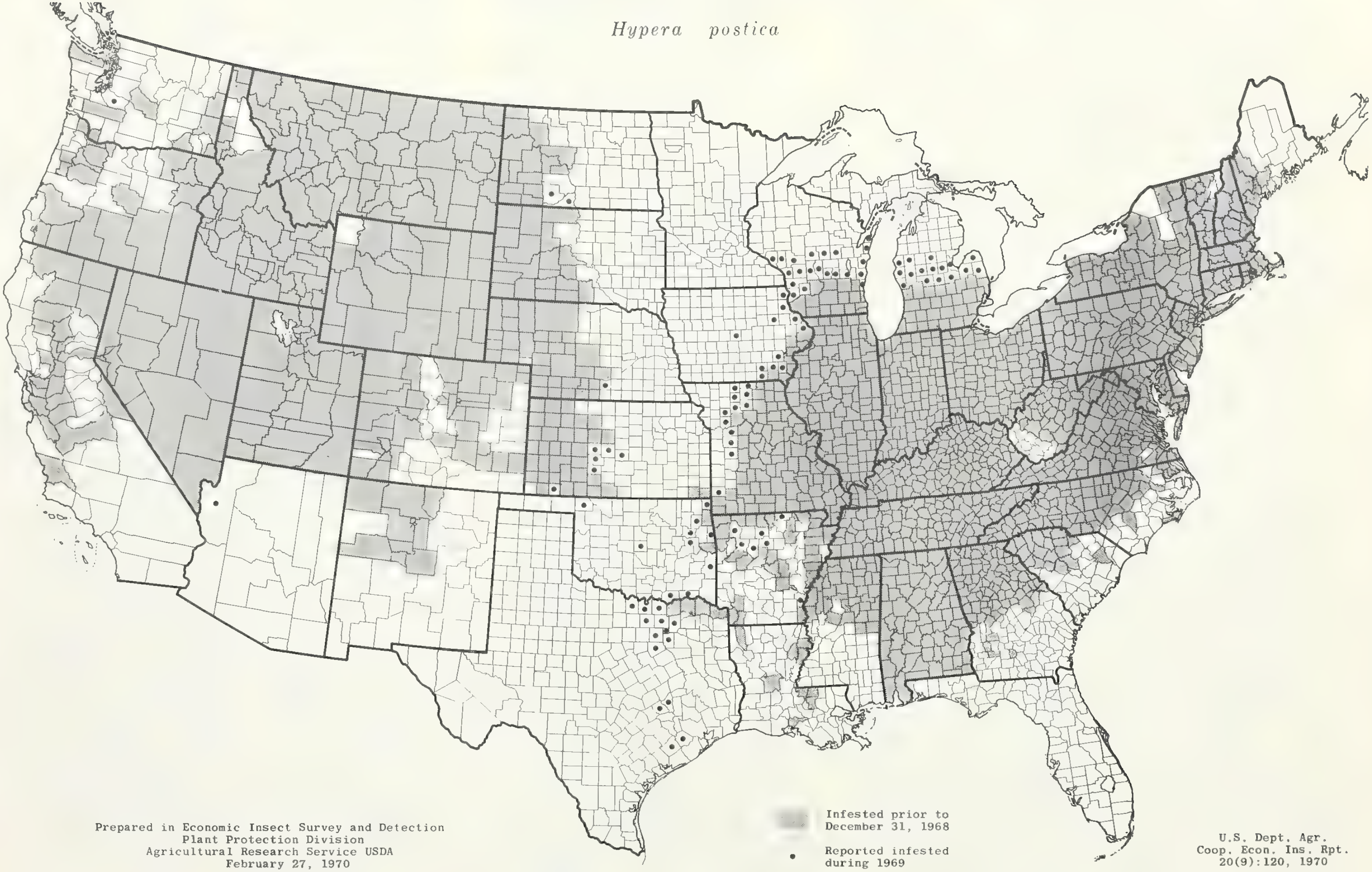
ALFALFA WEEVIL was severe on alfalfa in California, and damage was more extensive in New Mexico. This weevil was the most damaging pest of alfalfa in Utah, Wyoming, and Arkansas; infested more fields and is expected to continue at economic levels in the northern Black Hills of South Dakota; and increased in Nebraska. Alfalfa weevil was heavy on the remaining 3,000 acres of alfalfa in Alabama, and caused heavy damage in central and western Tennessee. Populations were the lowest in 4 years in Illinois. Infestations continued to decline or were light in several Eastern States, and the pest is now considered of minor importance in New Jersey. PEA APHID outbreaks on alfalfa in south-central and eastern Idaho were the largest and most widespread in 20 years. This aphid was economic on alfalfa in eastern South Dakota. Infestations were occasionally economic in the Pecos and Mesilla Valleys of New Mexico, and some problems developed on forage legumes in Texas. MEADOW SPITTLEBUG was heavier than in 1968 in Indiana, and was more abundant than at any time in the last 5 years in New Jersey. ALFALFA CATERPILLAR was more severe and general in New Mexico than in the past 10 years, and counts were heavy in the Arkansas Valley of Colorado. EUROPEAN CLOVER LEAF TIER was reported from California as a new Western Hemisphere record. This gelechiid caused serious damage to many clovers.

ALFALFA WEEVIL (*Hypera postica*) extended its range in Walla Walla County, WASHINGTON, infesting alfalfa hay and seed fields for the first time in the Gardena and Touchet area. Northern extensions were reported from Pierce and Kittitas Counties. In Kittitas County the infestation was extended 3-5 miles beyond the area infested in 1968. Larval populations remained light, less than 5 per sweep, on alfalfa in western OREGON, but appeared to be increasing, especially in Benton County. In other areas of the State where this pest has been established for as long as 50 years, counts were high. Larvae ranged 157-182 per sweep of alfalfa near Prineville, Crook County, in early June. Alfalfa weevil and EGYPTIAN ALFALFA WEEVIL (*H. brunneipennis*) were severe in most alfalfa-growing areas of CALIFORNIA early in the season. Egyptian alfalfa weevil built up on alfalfa in ARIZONA in early February, and averaged 18 per sweep by late February in Yuma County. Counts peaked at 10 per sweep in Maricopa County early in April. Alfalfa weevil adults were collected in Mohave County in mid-September 1969 for the first record of this pest in Arizona.

Cold, damp weather in NEVADA again retarded alfalfa weevil development until about mid-May. Economic populations developed explosively with favorable weather. Larvae peaked in excess of 250 per sweep, and damage occurred near mid-June. Controls were applied in late May and early June. The second crop was not damaged by adults as it was in 1967 and 1968. In IDAHO, larvae averaged 11 per sweep near Juliaetta, Latah County, on June 11 while new adults averaged less than one per sweep in an uncut field of blooming alfalfa. Larvae were abundant in Clark County throughout the year. Alfalfa weevil was the most damaging alfalfa insect in UTAH. Damage ranged from light to very severe. Total damage was slightly below average. Damage to alfalfa in northwest NEW MEXICO was more extensive than in previous years. Counts in COLORADO were heavy, 0-40 larvae and 0-6 adults per sweep, in late May and early June. Damage was moderate to heavy, especially where controls were not applied or were applied too late. Populations leveled off for the rest of the season and losses were light. Control was effective when proper methods and timing were used. Alfalfa weevil was again the most damaging crop pest in WYOMING, and damage was more severe than in 1968. June counts ranged 70-240 per sweep in the most heavily infested alfalfa fields. Counts were heaviest in Washakie, Fremont, Big Horn, and Johnson Counties.

Distribution of Alfalfa Weevil

Hypera postica


▨ Infested prior to December 31, 1968
● Reported infested during 1969

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February 27, 1970

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Alfalfa weevil larvae ranged up to 24.5 per sweep of irrigated alfalfa in McKenzie and Williams Counties, NORTH DAKOTA, by June 20. Up to 0.8 larva per sweep infested irrigated alfalfa in Mercer and Oliver Counties. Damage was less than 1 percent in all areas because alfalfa is cut before extensive damage occurs. Up to 0.9 per sweep on the second crop in mid-July caused no evident damage. Sioux and Grant Counties were new county records. Adults in SOUTH DAKOTA increased to 2.3 per sweep of alfalfa the first few days of June. Untreated alfalfa east of Spearfish, Lawrence County, had a high of 41 larvae per sweep June 17. In mid-July, adults remained at less than 1 per sweep, but larvae dropped to 3 per sweep. Economic damage was confined to the northern Black Hills, and to irrigated alfalfa in Fall River County in the southern Black Hills. Damage occurred primarily to the first crop prior to cutting and to the second crop when the first cutting had been left in windrows. Damaging numbers infested more fields in 1969 than in 1968. Early cutting saved most fields although insecticides were applied when infestations persisted or when the first cutting was delayed. Alfalfa weevil will continue to be economic in the northern Black Hills of South Dakota. Alfalfa weevil increased in NEBRASKA, but most damage in the central area was below economic levels. About June 4, adults declined and larvae peaked at 12.2 per sweep in 1 field. Counts declined gradually. Kearney County was a new county record. This pest was not economic in KANSAS. Rush, Pawnee, Edwards, Barton, Rice, and Seward Counties were new county records.

Alfalfa weevil was light from mid-May to mid-June in all areas where it is known to occur in OKLAHOMA. It was reported for the first time in Ottawa, Mayes, Wagoner, Muskogee, Adair, Le Flore, Choctaw, Bryan, Oklahoma, and Harper Counties. Alfalfa in several northeast counties of TEXAS was found infested with this weevil in mid-April. Surveys revealed heavy populations in Brazos, Burleson, and Wharton Counties. Alfalfa weevil continued to be a major pest of alfalfa in most areas of ARKANSAS. Larvae were heaviest, 10 in one sweep, in the northeast area in mid-April. The peak was passed in late May. One larva was collected in the northwest area August 15 which is unusual for midsummer. Controls cost about $80,000. Madison, Johnson, Pope, Searcy, Van Buren, Fulton, and Desha Counties were new county records. Infestations were heavy in ALABAMA. All 3,000 acres of alfalfa remaining in the State were treated. Damage also occurred on white clover, vetch, and other legumes. Damage in TENNESSEE was first reported from Lincoln County April 11. Damage was heavy in central and western areas during late spring and early summer. Larvae ranged up to 3 per sweep of alfalfa in Montgomery County.

Alfalfa weevil egg viability in MISSOURI averaged 64.9 percent. Late March and early April larval counts in alfalfa ranged from less than 1 per sweep in the south-central area to 1.2 per sweep in the southeast area. Some controls were applied in the southeast area, but most were applied in the south-central and east-central areas. During 1969, 12 new counties were reported for the first time, making a total of 93 counties known to be infested in Missouri. Populations in ILLINOIS were the lowest of the past 4 years. Infestations were late, and alfalfa was growing rapidly when larvae were generally present. This late emergence enabled Bathyplectes curculionis (an ichneumon wasp) to help control infestations. In some fields over 90 percent parasitism occurred, with 60-80 percent common during periods of high populations. Adults averaged less than 1 per sweep of alfalfa and larvae 1 per stem on May 9 in southeast WISCONSIN. Adults and larvae averaged less than one per sweep from late May until early July. Kenosha County had 1.8 larvae per sweep June 20. Damage was not economic. A total of 22 new counties was reported. Larvae in MICHIGAN infested Mason, Lake, and Clare Counties and all counties south of and in the line running from Oceana County to Huron County. Controls were needed many times over 1968. Some counties harvested the largest part of the first crop without treating; the second crop was treated however. Because weather prevented early harvesting in the southern and southeastern areas, damage to the first crop was heavy. In INDIANA, counts were highest in the south-central district. Larvae ranged 165-761 per square foot by April 26. Counts dropped in the southwest and west-central districts due partly to heavy parasitism, mostly by B. curculionis, and possibly predation by lady beetles. Hippodamia tredecimpunctata and Coleomegilla maculata adults ranged 0.5-1.7 per sweep in the northwest district by May 16. Damage was reduced statewide except in the south-central and eastern districts. One chemical application sufficed in much of the low-population area. A slow buildup of alfalfa weevil, especially in the east district, allowed growers in the northeast district to take the first crop without treatment. By the week ending May 23, larvae per square foot by district ranged: Northwest and west-central 0-320, central 0-480, and east-central and northeast 80-640. Alfalfa weevil can destroy 50-100 percent of the first alfalfa crop anywhere in OHIO. Egg deposition peaked about May 15. By late May there were about 5 larvae per terminal. By early June, many fields had 15 larvae per sweep and frosting damage. Damage ranged from 50 to 75 percent in untreated alfalfa in the southern area. By the end of June, new adults were almost as numerous, about 0.4 per sweep, as overwintered adults.

Alfalfa weevil adults in WEST VIRGINIA ranged from 0.9 per sweep in some western counties to 0.2 per sweep in the eastern counties. Overall alfalfa acreage was smaller than in past years; most stands were mixed clover and alfalfa. Numbers were heaviest in Mason County on a stand of two-year-old alfalfa. Adults were heavy, but damage was light. Damage ranged light to moderate over most of VIRGINIA. Alfalfa weevil has been declining on alfalfa in MARYLAND. Infestation levels in 1969 were the lightest in 15 years, mainly due to increased parasitism. *Microctonus colesi* (a braconid), *B. curculionis*, and *Tetrastichus incertus* (a eulophid wasp) appear to be the major parasites. Although alfalfa weevil populations were noneconomic in April and May, many growers applied stubble sprays after the first cutting. Damage throughout most of DELAWARE was very light on the first crop of alfalfa. Chemical controls were applied to a very few fields in eastern Sussex County. Populations in NEW JERSEY were extremely light. Only 8.5 percent of the growers needed to apply insecticides. A complex of parasitic wasps has been very active. Formerly the major agricultural pest in New Jersey, alfalfa weevil is now of very minor importance. Alfalfa weevil continued a decline which started 4 years ago in eastern PENNSYLVANIA. It is also declining for the first time in the northwest area. Damage was serious in a few widely scattered fields. Larval feeding before mid-May was nil. About 90 percent of the first crop was cut without spray protection; about 10 percent of the second crop received stubble protection. Alfalfa weevil was below normal in CONNECTICUT, and damage was light in unsprayed alfalfa by June 23 in Washington County, RHODE ISLAND.

CLOVER HEAD WEEVIL (*Hypera meles*) is still a serious pest of crimson clover seed production in central ALABAMA where 3,000+ acres received 1-2 insecticide applications. CLOVER LEAF WEEVIL (*H. punctata*) damaged some alfalfa in Millard, Salt Lake, Tooele, and Weber Counties, UTAH. SWEETCLOVER WEEVIL (*Sitona cylindricollis*) severely damaged new seedings of sweetclover in some areas of northwest MINNESOTA in June. One report indicated 100 percent damage to 3 to 4-inch sweetclover. CLOVER SEED WEEVIL (*Miccotrogus picirostris*) in IDAHO ranged 2-30 per sweep of white clover at Nezperce, Lewis County, and 10-35 per sweep in 3,000 acres at Bonners Ferry, Boundary County, in early June.

PEA APHID (*Acyrthosiphon pisum*) remained low on alfalfa in western OREGON. July counts averaged 100 per sweep of mature second-crop alfalfa at Kiger Island, Benton County. From mid-July to September most aphids were parasitized, principally by *Aphidius* sp. (a braconid), at Corvallis, Benton County. Pea aphid has increased and become widespread in CALIFORNIA. In NEVADA a buildup on alfalfa hay in Clark County in early April declined to low levels by late April due to predators. In July heavy numbers on alfalfa hay in Lyon County required controls. Populations throughout southwest IDAHO were light on seed alfalfa. Some fields had economic numbers ranging up to one cupful per sweep. From July 15 to August 15, outbreaks stunted alfalfa in south-central and eastern areas. Some fields were cut; others were treated. These damaging populations were the largest and most widespread of any in the last 20 years. Numbers were normal or below in many areas of UTAH. During late summer, alfalfa was damaged in Sevier, Sanpete, San Juan, Cache, Morgan, and Millard Counties. Pea aphid was active in Hot Springs and Washakie Counties, WYOMING, in early May. Populations peaked in late July and then declined. Parasites and predators were effective. A few alfalfa fields were treated in Fremont, Platte, and Washakie Counties.

Pea aphid infestations were occasionally economic in the Pecos and Mesilla Valleys of NEW MEXICO and required treatment. Some problems developed on forage legumes in TEXAS. Numbers in ARKANSAS ranged from 1 to 12-15 per square foot until late February. Counts increased to 3-4 per 10 sweeps in the southwest area, by mid-March and to 10 or more in one sweep of crimson clover in late April and early May. Populations in OKLAHOMA were heavy mostly in the western half of the State during April and May.

Pea aphid caused no appreciable damage even with a buildup in east, southeast, and central districts of NEBRASKA in May and June. Some light damage to alfalfa occurred in the northeast district in mid to late June. Numbers increased gradually through April and May, peaked the third week of May, and then declined. Counts were highest, 2.8-11.5 per sweep, in Lancaster, Thurston, Jefferson, and Saline Counties May 24; 11.7 per sweep was found in Dawson County in late August. About 100 per sweep caused no damage in 3 sweetclover fields in Butler County November 5-6. In SOUTH DAKOTA a buildup, over 400 per sweep, in June damaged alfalfa at Gayville, Yankton County, and Meckling, Clay County. In early July, numbers dropped but still ranged up to 250 per sweep. Lady beetles increased to 2 per sweep, and checked counts in some areas. Pea aphid was economic in Clay, Yankton, Turner, Deuel, Beadle, and other eastern counties. Of 488,660 acres infested, about 250,000 acres were sprayed, mostly in Clay, Yankton, and Turner Counties. In some of the more heavily infested fields, yields from the second crop were reduced 50 percent or more.

Pea aphid ranged up to 500 per sweep on alfalfa in the southern half of MINNESOTA in July. A small acreage was sprayed in the central district. Pea aphid was not economic in WISCONSIN. Up to 50 per sweep infested alfalfa in Rock, Green, Grant, Iowa, and Dane Counties May 2, but half were parasitized. Parasitism increased in Dane and Rock Counties July 11 and more than 5 aphids per sweep in July and August were unusual. Populations averaged 10 per sweep on alfalfa early in September in south-central and southwest counties. About 50 percent parasitism in central counties resulted in 1 aphid per sweep October 24. Pea aphid populations on alfalfa in northern INDIANA ranged from 7-25 per sweep in May to averages of 40-60 per sweep in September. Counts in OHIO remained at 15 or less per sweep until weather turned hot and dry in August. Counts were 20 per sweep by mid-August in the northwest area, 20-50 per sweep by August 31 in the southeast area, and as many as 100 per sweep by September 3 in some northwest area fields. Yellowing ranged light to moderate in a few fields. Heavy pea aphid infestations occurred so late that chemical control was not economic or needed. A decline in the last half of September may have been partly due to wet weather.

Pea aphid caused no economic damage in VIRGINIA. Numbers in MARYLAND began to increase, 1-10 per sweep on alfalfa in late April. Early May brought sharp increases, 40-80 per sweep, in isolated acreages in Dorchester, Harford, Kent, and Washington Counties. Infestations remained light, 5-20 per sweep, in other areas. Counts in DELAWARE averaged 2.5 per sweep in early May. The highest numbers infested New Castle County alfalfa in mid-June. This aphid caused very little injury in NEW JERSEY.

LYGUS BUGS (*Lygus* spp.) in ARIZONA were a year-round problem. Numerous *L. elisus*, *L. hesperus*, and related species damaged seed alfalfa in UTAH. *Lygus* spp. adults and nymphs in southwestern IDAHO often exceeded 300 per 10 sweeps in untreated seed alfalfa during late summer. *Lygus* sp. infestations on WYOMING alfalfa were about equal to those found in 1968. Populations remained noneconomic.

TARNISHED PLANT BUG (*Lygus lineolaris*) adults in central INDIANA ranged 30-70 per 10 sweeps of alfalfa by May 2. The July, August, and September average for the State was 23 per 10 sweeps, about half of which were adults. Tarnished plant bug was the most abundant, 2-4 per 10 sweeps, and persistent of 4 plant bugs common on alfalfa and clover in OHIO. Adults were low, 0.6-3.9 per 10 sweeps of alfalfa, over most of WEST VIRGINIA. One field in Mason County had 7.7 per 10 sweeps. Numbers should be similar in 1970. Tarnished plant bug caused very little damage in VIRGINIA. Numbers were lighter than in 1968. Abundant on many crops in DELAWARE, tarnished plant bug peaked on alfalfa in mid-July.

MEADOW SPITTLEBUG (*Philaenus spumarius*) in MINNESOTA was heavier on alfalfa and clover this past season, but numbers were rarely heavy enough to warrant spraying. It was found only in the southeast and east-central districts and eastern edges of the central and south-central districts. Numbers in WISCONSIN were not economic. They were heavier than normal in central counties and lighter than normal in southwestern counties. About 11,500 acres were treated. Meadow spittlebug was not economic in ILLINOIS. Adults in the fall peaked at 23 per 10 sweeps in Winnebago County and 20 per 10 sweeps in Ogle County. Populations in INDIANA were heavier and more widespread in 1969 than in 1968. By May 9 it infested 20-70 percent of the alfalfa stems in the southeast and northeast districts. Controls were recommended in the latter district. In late April, first instars averaged 9 per 10 stems of clover in Floyd County and occurred in trace numbers on alfalfa in Jackson County. Adults in WEST VIRGINIA ranged 7-17 per 100 sweeps in the eastern counties in mid-July, and 5-25 per 100 sweeps in the western counties. Damage ranged light to moderate over much of VIRGINIA. Infestations were lighter than in 1968. Alfalfa in MARYLAND did not need much control. Red clover needed controls in two 60-acre fields in Queen Annes County. Numbers throughout PENNSYLVANIA are increasing. Damage approached the economic threshold in some fields. Although numbers were not economic throughout NEW JERSEY, they were more abundant than at any time in the last 5 years. Numbers were light on alfalfa June 23 in Washington County, RHODE ISLAND.

ALFALFA PLANT BUG (*Adelphocoris lineolatus*) remained noneconomic on alfalfa in WYOMING. In WISCONSIN it was not economically important on forage legumes. About 2,300 acres were treated for plant bugs, of which this was the most numerous species. Late instars ranged 40-170 per 10 sweeps in alfalfa in the northern half of INDIANA by June 6. July to September averages dropped to 16 per 10 sweeps. The following plant bugs were 3 of 4 plant bugs common on alfalfa and clover in OHIO. RAPID PLANT BUG (*A. rapidus*) adults became numerous the last week of May. Counts averaged about 10 per 10 sweeps in southern and southeastern areas. MEADOW PLANT BUG (*Leptopterna dolabrata*) adults became numerous the last week of May, averaging 10 per 10 sweeps in some fields. *A. lineolatus* adults became prevalent the last week of July. Averaging 8-10 per 10 sweeps, adults peaked about August 5 in Ohio.

ALFALFA CATERPILLAR (*Colias eurytheme*) adults were heavy in eastern WASHINGTON in late summer, particularly in Whitman County. Larval damage was scarce. It is still a pest of alfalfa in scattered locations of CALIFORNIA. Larvae in ARIZONA infested alfalfa during July in Cochise and Yuma Counties. Numbers were heavy in Pima, Pinal, and Maricopa Counties. Larvae began building up on second-crop alfalfa in the Mesilla Valley and along eastern NEW MEXICO from Eddy County to Quay County. In July and August many growers cut early or treated. Infestations were more severe and general than in the past 10 years. In COLORADO, larvae ranged up to 1,800 per 100 sweeps of alfalfa in the Arkansas Valley, mainly in Bent and Prowers Counties, in late July and early August. Heavy populations, 0-50 per 100 sweeps, were scattered. Light numbers, 0-20 per 100 sweeps, occurred in northeastern and east-central areas. Damage ranged light to moderate, heavier in isolated areas. Light numbers occurred in UTAH.

BEET ARMYWORM (*Spodoptera exigua*) and other cutworms damaged alfalfa and clover in CALIFORNIA. *S. exigua* larvae in ARIZONA infested alfalfa all year. High numbers occurred in April, May, and August in Yuma County. Controls were needed. FALL ARMYWORM (*S. frugiperda*) ranged moderate to heavy on alfalfa in the western half of OKLAHOMA, except in the panhandle, from early September to mid-October. Numbers were heavy in the southeastern area in early November.

These noctuids were troublesome in the western area. WESTERN YELLOW-STRIPED ARMYWORM (*Prodenia praefica*) damaged alfalfa in WASHINGTON. *P. praefica* in IDAHO ranged up to 2 per square yard of alfalfa and sweetclover at Lewiston, Nez Perce County, in early July. Seedling alfalfa was about 50 percent defoliated. ZEBRA CATERPILLAR (*Ceramica picta*) was light on alfalfa in Churchill, Douglas, and Pershing Counties, NEVADA, from July through October. Numbers increased noticeably on alfalfa hay in Lyon County in mid-September. Half-grown to full-grown larvae were heavy by late September and early October. Cutting the third crop was a control measure; no chemicals were applied. The infested area in Lyon County was twice as large as that of 1968. CABBAGE LOOPER (*Trichoplusia ni*) treatments in ARIZONA were required on alfalfa in September and October at Yuma, Yuma County. This was probably the most difficult insect to control in 1969.

Other Lepidoptera were also troublesome. Originally found at Lincoln, Placer County, CALIFORNIA, EUROPEAN CLOVER LEAF TIER (*Mirificarma formosella*) now occurs in Butte, Nevada, Yuba, Sutter, El Dorado, and Sacramento Counties. It seriously damages many clovers. This was a new Western Hemisphere record. OMNIVOROUS LEAF TIER (*Cnephasia longana*) was unusually heavy on crimson clover this spring in the Willamette Valley of OREGON. Numbers appear to have been much heavier than in the last few years, especially in Marion and Washington Counties. A WALSHIID MOTH (*Walshia miscecolorella*) appears to be increasing in eastern NEBRASKA. Damage to sweetclover was very apparent in 1969. Gage, Seward, Butler, Colfax, and Dodge Counties were new county records. EUROPEAN CORN BORER (*Ostrinia nubilalis*) in CONNECTICUT was extremely heavy, the worst in years.

Economic numbers of FIELD CRICKETS (*Gryllus* spp.) in SOUTH DAKOTA damaged uncut alfalfa in southeastern Tripp County the first week of July. Counts ranged 5-10 second and third instars per square yard on blooming alfalfa. RED-LEGGED GRASSHOPPER (*Melanoplus femurrubrum*) and MIGRATORY GRASSHOPPER (*M. sanguinipes*) slightly damaged alfalfa seedlings in west-central WISCONSIN August 1. Dry, sometimes hot weather late in July and throughout August favored grasshopper development. Numbers were heavy August 29 in alfalfa on light soils in Washburn, south-central, southwestern, west-central, and central counties; some fields had 30 per square yard. Feeding was heavy on soybeans in some Lafayette County fields. Damage statewide was insignificant. Numbers have been increasing slightly the last 3 years. About 5,500 acres were treated.

ALFALFA SEED CHALCID (*Bruchophagus roddi*) was lighter in NEVADA than in 1968 and much lighter than 1967 when a high of up to 20 percent loss occurred in Humboldt, Lander, and Pershing Counties. Infestations in UTAH were almost normal.

WESTERN FLOWER THRIPS (*Frankliniella occidentalis*) in UTAH was very numerous in blooming alfalfa in Millard, Tooele, Box Elder, and Utah Counties. A SPRINGTAIL (*Sminthurus dorsalis*) ranged up to 250 per 100 sweeps in irrigated alfalfa in Oliver County, NORTH DAKOTA, for a new State record. No damage was evident.

PACIFIC SPIDER MITE (*Tetranychus pacificus*) ranged medium to heavy on seed alfalfa in Humboldt County, NEVADA, in July. Controls were needed on 4,000+ acres, 3 times the acreage treated in 1968. SPIDER MITES (*Tetranychus* spp.) were widespread on seed alfalfa in southwestern IDAHO. Many fields required treatment in July and August. TWO-SPOTTED SPIDER MITE (*T. urticae*) reduced seed yields in 18 acres near Nampa, Canyon County, in early September. Overwintered populations of CLOVER MITE (*Bryobia praetiosa*) were active at Homedale, Owyhee County, in late April; at Nezperce, Lewis County, April 30; and at Gooding and Wendell, Gooding County, May 9.

SOYBEANS

Highlights:

Larvae of several NOCTUID MOTHS caused some damage in soybean-growing areas. MEXICAN BEAN BEETLE damaged occasional fields in Indiana and a few fields in Virginia and Alabama. BEAN LEAF BEETLE was heavy in some counties in Alabama. THRIPS caused some injury in Delaware.

Although BEET ARMYWORM (Spodoptera exigua) seldom occurs in ARKANSAS, it infested most soybean fields in the southern half of the State in 1969. Counts became lighter the farther north infestations occurred. The highest count was 63 on 30 row feet September 3 in Lafayette County. Combined with Heliothis zea (corn earworm) treatments, control for beet armyworm did not add extra costs. Infestations of Pseudoplusia includens were more general and heavier than in many years. Virus and fungus diseases did not prevent buildup. Infestations of FALL ARMYWORM (S. frugiperda) were heavy in Brazos and Burleson Counties, TEXAS, in mid-September. GREEN CLOVERWORM (Plathypena scabra) larvae increased to 136 per 100 sweeps on plots in Nansemond County, VIRGINIA, in September. Mixed larval populations of CABBAGE LOOPER (Trichoplusia ni) and Pseudoplusia includens were moderate to heavy during August on 30 to 60-acre plantings of soybeans in the Levy and Alachua County areas of FLORIDA. In ALABAMA, green cloverworm larvae caused considerable ragging of soybean leaves throughout the State. The extent of damage is questionable. Mixed populations of Cabbage looper and P. includens were observed in the coastal counties and in lesser counts in central and northern areas. P. includens was the predominant species. Beet armyworm larvae were damaging to soybeans in Muskogee and Choctaw Counties, OKLAHOMA; and fall armyworm damaged soybeans in Le Flore and McCurtain Counties during September. Green cloverworm larvae were severe in many southeastern KANSAS soybean fields in late summer. Numerous fields were treated.

VELVETBEAN CATERPILLAR (Anticarsia gemmatalis) larvae caused heavy defoliation of soybeans at Gainesville, Alachua County, FLORIDA, during September. This pest was reported in numerous but isolated fields in coastal ALABAMA, with heavier counts in the extreme southwest area. Infestations were noted north into Dallas, Montgomery, and Lee Counties but were not serious. Larvae were light on late soybeans in many counties of middle and west TENNESSEE. No appreciable damage was observed. Although velvetbean caterpillar rarely occurs in ARKANSAS, it was heavier and more widespread than previously known. It infested soybeans in the southern 60 percent of the State. Infestations became progressively lighter the farther north they occurred. The highest count was 52 on 30 row feet September 3 in Lafayette County. Larvae fed on foliage but were not economic. Drought in Lafayette and Conway Counties reduced yields so drastically that controls were not applied. Velvetbean caterpillar was heavy on soybeans in Wagoner County, OKLAHOMA in mid-September.

LESSER CORNSTALK BORER (Elasmopalpus lignosellus) seriously damaged young soybeans in a few fields in southern ALABAMA, mainly in Covington County. YELLOW WOOLLYBEAR (Diacrisia virginica) damaged occasional fields of soybeans in Hall, Fillmore, Seward, Saunders, Burt, and Colfax Counties, NEBRASKA. Defoliation ranged up to 65 percent in 1 Colfax County field, but was generally less than 5 percent elsewhere in the State.

MEXICAN BEAN BEETLE (Epilachna varivestis) caused the usual heavy damage to scattered fields in south-central and southeast INDIANA. Affected areas did not increase. In MARYLAND, this pest defoliated 20-40 percent of 900 acres of soybeans in Prince Georges, Charles, Worcester, and Somerset Counties. There was less than 10 percent injury. No controls were required in other sections. Economic damage was observed in only a few fields in Nansemond, Southampton, Isle of Wight, Surry, and Sussex Counties in VIRGINIA. Populations were very light during the summer. Mexican bean beetle was a serious pest in isolated soybean fields in southwestern ALABAMA, but counts were lower elsewhere.

BEAN LEAF BEETLE (Cerotoma trifurcata) populations were heavy in several Blackbelt counties in ALABAMA, especially Greene, Sumter, and Marengo where 50 or more percent of leaves were destroyed in some soybean fields. Adults were light throughout MARYLAND, rarely exceeding one per yard. No controls were applied. This pest caused practically no damage in VIRGINIA. Bean leaf beetle was present in soybeans and alfalfa throughout the season in NEBRASKA. Overwintering populations appeared to be heavier than normal. Counts ranged 10-15 per 20 sweeps in 1 Lancaster County alfalfa field on May 24. Feeding damage was observed on soybeans in June. Damage was still well below the economic level. Adults averaged about 4 per 20 sweeps on soybeans in Saunders County in June. In OKLAHOMA this species damaged late maturing soybeans in McCurtain County in late November.

Larvae of a GRAPE COLASPIS (Colaspis sp.) caused light damage to roots of soybeans in northeast ARKANSAS for the first report in several years. Larvae of a CERAMBYCID BEETLE (Dectes sp.) infested about 500 acres in Dunklin and Pemiscot Counties, MISSOURI, during September. They infested 45-75 (averaged 50) percent of the plants. It was noted feeding in all southeastern counties.

SOUTHERN GREEN STINK BUG (Nezara viridula) and BROWN STINK BUG (Euschistus servus) continued to be a problem on soybeans in FLORIDA. These two stink bugs infested soybeans after pod development in coastal ALABAMA, but damage was less than in several years. Southern green stink bug approached but did not exceed the economic threshold on soybeans in VIRGINIA until September. Damage to bean quality ranged light to moderate.

THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) was common on soybeans at Gainesville, Alachua County, and moderate on 25 acres of this crop at Freeport, Walton County, FLORIDA. These infestations resulted in withering of stems.

SEED-CORN MAGGOT (Hylemya platura) damaged seeds in portions of fields in 2 north-central counties of INDIANA in mid-June. Maggots infested the original and replacement plantings.

GRASSHOPPERS (Melanoplus spp.) infested marginal rows in ILLINOIS but damage was slight. The adult survey showed an increase that, with favorable weather, could indicate a serious problem by 1970. This area is south of a line from Rock Island, Rock Island County, to Champaign, Champaign County. Adults in this area ranged from 1.0 to 10.3 per square yard. Most of the populations, although higher than in 1968, indicate a light infestation for 1970.

Several species of THRIPS were very abundant on soybeans during mid to late June in DELAWARE causing much injury. Insecticides were required on some fields. Thrips ranged 5-15 per leaf on 6 to 8-inch plants in Dorchester, Wicomico, Caroline, Prince Georges, and Charles Counties, MARYLAND, in mid-June. Timely controls in late June prevented possible defoliation of large acreages in Dorchester and Wicomico Counties. Most fields had recovered from earlier damage by July 18.

TWO-SPOTTED SPIDER MITE (Tetranychus urticae) was generally light on soybeans over NEW JERSEY although several fields required controls. STRAWBERRY SPIDER MITE (T. turkestani) infestations on soybeans in MARYLAND were probably the lightest on record in 1969 due to the unusually wet summer.

PEANUTS

Larvae of several NOCTUIDS were troublesome on peanuts in several States, and control was difficult in some areas. GRANULATE CUTWORM (*Feltia subterranea*) fed heavily on a 29-acre planting in southern Columbia County, FLORIDA, in July. The planting was treated several times. In August, larvae of *Prodenia dolichos* were severe on a 50-acre planting at Lake City, Columbia County, and were common on peanuts at Blountstown, Calhoun County. In southeast ALABAMA, *F. subterranea* was a major pest in many fields. About 25 percent of the 183,000 acres of peanuts in the area was treated. Control was difficult. BEET ARMYWORM (*Spodoptera exigua*) larvae first damaged peanuts in a 100-acre field in Barbour County, ALABAMA, the first week of August. Controls were difficult. This pest was lighter in mixed populations with other leaf feeders in most of the acreage in the 9-county growing area in the southeast part of the State. FALL ARMYWORM (*S. frugiperda*) damaged peanuts in Roosevelt County, NEW MEXICO, from August 15 to first frost in October. About 1,200 acres were treated.

LESSER CORNSTALK BORER (*Elasmopalpus lignosellus*) larvae heavily infested 40 acres of peanuts at Sparr, Marion County, FLORIDA, during late summer. This pest damaged peanuts throughout southeast ALABAMA. Counts were moderate to occasionally heavy in east-central, southeast, and south-central OKLAHOMA in August and September. Lesser cornstalk borer infestations in TEXAS were heavy in wide portions of central, south-central, and the Cross Timber areas. Damage in most areas was particularly heavy, and controls were required.

RED-NECKED PEANUTWORM (*Stegasta bosqueella*) larvae were very light in most areas of OKLAHOMA most of the season. Mostly minor damage occurred in Roosevelt County, NEW MEXICO.

SPOTTED CUCUMBER BEETLE (*Diabrotica undecimpunctata howardi*) damage was widespread and ranged light to medium in Nansemond, Southampton, and Isle of Wight Counties, VIRGINIA.

THRIPS were heavy during spring in VIRGINIA. Foliage was damaged in untreated fields and also in fields treated with systemic insecticides. Lack of control was probably due to dry spring weather. TOBACCO THRIPS (*Frankliniella fusca*) occurred in damaging populations throughout the 9-county peanut-growing area of ALABAMA. Controls were required.

COTTON

Highlights:

BOLL WEEVIL caused serious damage in Arkansas, Mississippi, and Alabama. BOLLWORMS were major pests in Alabama and Arkansas, and caused concern in other States. BEET ARMYWORM was difficult to control in Arkansas and Arizona. CABBAGE LOOPER was a problem to control in Arizona. SPIDER MITES were more serious in Alabama than in 1968.

BOLL WEEVIL (*Anthonomus grandis*) infestations were spotted and heavy in the Coastal Bend, south-central, Blacklands, Rolling Plains, and Trans-Pecos areas of TEXAS during 1969. Several diapause control programs were initiated in the Coastal Bend area with considerable success. Reduction in the number of boll weevils going into diapause was noted at the end of the cotton season. Boll weevil infested cotton from early July through October in OKLAHOMA, and was heavy in several southwest and west-central counties during August and September. This pest ranged light to moderate in most other areas of the State during the same period. Boll weevil populations were very low in MISSOURI again in 1969. The heaviest infestation was located in the extreme southwest corner of Dunklin County.

Lighter infestations occurred along the western edge of Dunklin and Stoddard Counties and scattered areas of Butler County. Controls were applied to 500 acres. Boll weevil is the second most important pest of cotton in ARKANSAS. It infested 71 percent (76 percent in 1968) of the fields by late summer. At the peak of infestation 30 percent (23 percent in 1968) of the fields were above treatment level. Boll weevil, BOLLWORM (*Heliothis zea*), and TOBACCO BUDWORM (*H. virescens*) accounted for 95 percent of the total cotton insect control cost of $8.5 million in 1969. Boll weevil diapause control programs are now underway in Chicot, Lee, Lafayette, Pulaski, Faulkner, Conway, Pope, and Yell Counties. First boll weevils of the season in MISSISSIPPI were collected on 4 to 5-leaf cotton in Yazoo County in late May. Infestations began increasing steadily in July. Maximum infestations were reached in late August. Boll weevils were collected as late as September 5. The loss to cotton in Mississippi for 1969 is estimated at $32 million, excluding control costs. Boll weevil was difficult to find in west TENNESSEE by June 20; however, feeding signs in terminal buds were easily detected. Some feeding and egg laying punctures were found in older cotton the week ending June 27. Control for overwintering weevils began about this time. Square counts indicated that about 14 percent of the squares were punctured in the regularly weevil infested range in mid-July. Most infestations were spotty. From mid-July to late July, there was a lull between overwintering and first-generation weevils. First generation peaked about August 1, and short distance migration was noted. Migration to rank cotton continued throughout August, and much damage to small bolls was noted. Conditions were ideal for increase in early September. Migration to uninfested counties to the north was observed. The southern tier of counties in west Tennessee was generally infested by this time. Control was effective, and the only major damage was in fields where no controls were used. Boll weevil was heavy and damaging throughout ALABAMA. Migration from overwintering sites to fields occurred later than in 1968. First adults were reported May 6 in Monroe, Henry, Dallas, and Houston Counties. First boll weevils in the northern area were taken in a wing trap in Limestone County on May 12. The first field occurrence was noted in a nearby field May 13. Adults emerging from hibernation were heavy throughout south and central Alabama. Heavy populations developed northward to Marion, Jefferson, and Randolph Counties in June and July as a result of the first generation. These populations were much lighter in the northern area and most growers did not need to apply insecticides during first field generation "hatchout" in late July and August. Populations thereafter became damaging throughout most of the State. Eighty percent or more of cotton acreage received 8-18 applications of insecticide in the south and central areas and about 2-6 in most of the northern area. Populations entering hibernation in the fall were heavy statewide.

For Boll Weevil in the Texas High Plains and Boll Weevil Complex see CEIR 20(8):85.

BOLLWORM (*Heliothis zea*) and TOBACCO BUDWORM (*H. virescens*) were major pests of cotton throughout ALABAMA following a buildup of 2 or more generations on clover, vetch, and corn. Bollworm and tobacco budworm infested cotton as early as June 20 in the delta and other areas of MISSISSIPPI. Populations began increasing in July and reached 20 percent in some Attala County fields during late August. Moderate to heavy counts were still present on green cotton in Oktibbeha County in early October. Loss was estimated at $8 million. Larvae were first found in west TENNESSEE the week ending June 6 on seedling cotton. By the first of July, eggs and larvae occurred in all fields. Much damage was observed throughout the western area in July. Damage continued into August, especially in rank cotton. In early September damage was heavy to all stages of fruit growth in rank cotton. Bollworm is the major pest of cotton in ARKANSAS. Populations were the heaviest since 1963. Early moth and larval counts were very light, but by late August, 84 percent of the fields surveyed were infested. Phosphate resistance was exhibited in populations tested from Lafayette and Jackson Counties, and resistance is suspected in other areas. Tobacco budworm was more widespread in 1969 than in 1968. *H. virescens* made up 8.5 percent of the *Heliothis* larval population in the State. In the southwest area it comprised 21.6 percent of the population in 1969 compared with 67 percent in 1968. The percentage of *H. virescens* in the southeastern area was the highest ever observed in this area, with 34-36 percent in Desha

County in late August and early September. These species and BOLL WEEVIL (*Anthonomus grandis*) accounted for 95 percent of the total cotton insect control cost of $8.5 million. In MISSOURI, bollworm and tobacco budworm began a slow buildup in mid-July that continued until harvest. By the third week of August, 80 percent of the fields were infested. Controls were applied to 33.7 percent (5,732 acres) of the acreage scouted. This included the acreage requiring more than one application. Bollworm infested cotton from mid-July through October in OKLAHOMA. Infestations ranged light to moderate in most areas during the season. A few heavy infestations occurred in the south-central area in late August and September. Bollworm and tobacco budworm were detected throughout the cotton-growing areas of TEXAS. Generally, infestations were somewhat lighter than during 1968. Infestations in the High Plains were very heavy and damage was reported during 1969. Bollworm populations were heavy in NEW MEXICO, and caused extensive damage to bottom and middle bolls in Hidalgo, Luna, and Dona Ana Counties, as well as in most eastern counties. Treatment of infested fields was required. In ARIZONA, *H. zea* was light to moderate in some fields during August, September, and October in Maricopa, Pima, and Pinal Counties. Late July infestations damaged a few fields in Yuma County. *H. zea* caused about normal damage in CALIFORNIA.

BEET ARMYWORM (*Spodoptera exigua*) larvae were reported light on 2 to 5-leaf cotton May 5 in Henry, Monroe, Dallas, and Autauga Counties, ALABAMA, and in Madison County May 13. Damage to squares, blooms, and bolls became more widespread than previously recorded in the State. This species did not become a major cotton pest and specific controls were not necessary. Seldom a pest of cotton in ARKANSAS, beet armyworm was much heavier than previously. In the southern half of the State, populations increased southward so that counts were highest in the southernmost area. No control costs were added as cotton was treated for other pests. Controls used gave unsatisfactory results for this pest. Problems were encountered in controlling beet armyworm infestations on young squaring cotton in August in Maricopa and Pinal Counties, ARIZONA. Larvae caused much damage to cotton in most areas of CALIFORNIA.

CABBAGE LOOPER (*Trichoplusia ni*) was heavy in some fields in Pinal and Yuma Counties, ARIZONA, during August and September. Controls were difficult in solid planted cotton. This was probably the most difficult insect to control in 1969. Cabbage looper became a problem in cotton in NEW MEXICO during summer. Populations ranged from light to extremely heavy. Defoliation was almost complete in heavily infested fields when uncontrolled. Larvae caused scattered damage to cotton late in season in OKLAHOMA, especially in the southwest area in late September. Infestations were light in August and caused no major problems in west TENNESSEE. Virus-infected larvae were found in all fields checked from August to mid-September. In ALABAMA, *T. ni* and *Pseudoplusia includens* began appearing in cotton about June 15 but were not noticeable on leaves until August 15. Some controls were applied for these pests in the northern areas.

COTTON LEAFWORM (*Alabama argillacea*) was found infesting cotton in Tuscaloosa and Mobile Counties, ALABAMA. This was the first report of the pest in the State for the past 2-3 years. No economic damage was reported. STALK BORER (*Papaipema nebris*) larvae infested several fields of cotton in TENNESSEE in late June. Infestations usually occur much later in the season. Larvae were found in 75 percent of the stalks on the outer edge of a field in Dyer County in late June. Heavy damage was isolated throughout the season.

COTTON LEAF PERFORATOR (*Bucculatrix thurberiella*) was again severe on desert cotton and was very difficult to control in CALIFORNIA. The major trouble area in ARIZONA was Yuma County where sprays were repeated numerous times. Moderate to heavy counts occurred from mid-July through October. Generally, populations were light in other cotton counties. Heavy populations developed in mid-September in a few fields in Maricopa and Pinal Counties but dropped to noneconomic levels when heavy rains occurred. In NEW MEXICO, cotton leaf perforator had been found only occasionally prior to 1969. The pest started to build up and damage cotton foliage in Dona Ana and Eddy Counties just prior to frost, but damage was not economic. This lyonetiid was found on cotton in many counties throughout south, central, and east TEXAS, as well as many counties in the Trans-Pecos area in 1969. Infestations were reported from Gaines, Andrew, and Martin Counties in late September and early October. Infestations were also observed in Houston County. The pest was detected in Brazos and Burleson Counties in September and October. Adults of cotton leaf perforator were collected on cotton at Vero Beach, Indian River County, FLORIDA, for a new State record.

EUROPEAN CORN BORER (*Ostrinia nubilalis*) larvae infested bolls and stalks in MISSOURI. Damage was lighter than in the past 2 or 3 years, due to early cotton harvest.

TARNISHED PLANT BUG (*Lygus lineolaris*) caused light damage throughout the growing season to pinhead squares in west TENNESSEE. *L. lineolaris*, *Neurocolpus nubilus*, and COTTON FLEAHOPPER (*Pseudatomoscelis seriatus*) are the principal plant bugs infesting cotton in ARKANSAS. *L. lineolaris* and *N. nubilus* damaged young bolls during August in the extreme northeastern area the past two years. About 5 percent of the cotton was treated for all plant bugs in early August 1969. *P. seriatus*, *L. lineolaris*, and RAPID PLANT BUG (*Adelphocoris rapidus*) infested as much as 100 percent of the scouted acreage at one time during the growing season in MISSOURI. Plant bugs, although present in most fields throughout the growing season, reached economic levels in very few fields. Control measures were applied to only 449 acres. *P. seriatus* infested cotton plants from late June through August in OKLAHOMA. Infestations were moderate to heavy on cotton in most south-central, southwest, and west-central counties during July and August. LYGUS BUGS (*Lygus* spp.) infestations remained light on cotton in NEVADA.

A LARGID BUG (*Largus succinotus*) infested cotton in TENNESSEE in July. This was the first record of the species in the State.

TWO-SPOTTED SPIDER MITE (*Tetranychus urticae*) and other SPIDER MITE infestations in ALABAMA were largely confined to the central and northern areas. Although not so severe as from 1957 through 1962, they were more serious pests during this dry season than in 1968 or for the past 4-5 years, especially in the central area. The widespread use of preplant systemic insecticides contributed to early and midseason suppression of infestations. Spider mites began to increase in early July in west TENNESSEE. Most infestations were found in spots on the borders of cotton fields in July. Infestations became more general throughout the area during August, and caused several fields to mature by September. Only spot treatments were applied for spider mites in many cases in ARKANSAS. Less than 1 percent of the fields required treatment. Spider mites, mainly STRAWBERRY SPIDER MITE (*T. turkestani*), infested 15.2 percent of the scouted cotton acreage in MISSOURI. Spot and strip treatments were effective and few fieldwide applications were made. Spider mites were a minor problem in NEVADA, and were generally not so damaging as in 1968 in CALIFORNIA.

Early populations of COTTON APHID (*Aphis gossypii*) on untreated cotton in ALABAMA ranged 1-50 per plant on 2 to 4-leaf cotton throughout the State. Controls were accomplished in 10-20 days by large numbers of *Hippodamia convergens* (convergent lady beetle) and other predators. Some discoloration of lint occurred in isolated fields late in the season due to sooty mold growing on honeydew residues from aphids feeding on top leaves. Only isolated infestations of cotton aphid occurred on seedling cotton in MISSOURI. Beneficial insects kept all populations under control. Treatment was made to 81 acres.

THRIPS, mainly TOBACCO THRIPS (*Frankliniella fusca*) and FLOWER THRIPS (*F. tritici*), infested cotton in ALABAMA. Infestations occurred especially during the 2 to 6-leaf stages. Controls were quite general in the northern area and southward into much of the central area. In MISSOURI, *F. fusca*, *F. tritici*, and *Sericothrips variabilis* were widespread and extremely heavy, but cotton was past the 4-leaf when greatest pressure was exerted. Controls were applied on 9,102 of the 17,005 acres scouted. The acreage treated included 4,229 acres to which systemic insecticides were applied at planting time. *Frankliniella* spp. were found in cotton in OKLAHOMA in June and July. Infestations were heavy in a few areas in south-central, southwest, and west-central counties.

TOBACCO

Highlights:

TOBACCO FLEA BEETLE was troublesome in several States. Infestations in Florida were the heaviest on cigar-wrapper tobacco since 1962. CUTWORMS damaged young cigar-wrapper transplants and CABBAGE LOOPER infestations were the heaviest since 1966 in Florida. BUDWORMS were heavy in Maryland, and controls were effective against GREEN PEACH APHID in the State. WIREWORM damage was the worst in several years in Washington County, Virginia.

TOBACCO FLEA BEETLE (*Epitrix hirtipennis*) was generally light on flue-cured tobacco in FLORIDA. However, local infestations were heavy, with up to 150 adults per leaf. Populations on cigar-wrapper tobacco were the heaviest since 1962. Damage was light due to controls. This flea beetle damaged tobacco in several areas of TENNESSEE during July. In MARYLAND, isolated heavy infestations of tobacco flea beetle were encountered in Charles, Prince Georges, Anne Arundel, and Calvert Counties. Counts ranged 3-8 per plant on newly set tobacco early in the season. Controls were required in several fields. Generally, populations remained light to moderate and were below economic levels. Tobacco flea beetle caused light to medium damage to tobacco in most areas of VIRGINIA.

CUTWORMS, mostly GRANULATE CUTWORM (*Feltia subterranea*), caused moderate to severe damage to young transplants of cigar-wrapper tobacco in FLORIDA. During midseason, larvae were observed climbing stalks and the crop was severely damaged in some fields. CABBAGE LOOPER (*Trichoplusia ni*) larvae increased on flue-cured tobacco in the State, and caused moderate damage. Infestations ranged moderate to heavy on cigar-wrapper tobacco, and were the heaviest since 1966. The second brood was more damaging than the first brood. HORNWORMS (*Manduca* spp.) rarely exceeded 1-3 per 50 tobacco plants in Prince Georges, Charles, Anne Arundel, Calvert, and St. Marys Counties, MARYLAND. The second brood, which infested mature tobacco, showed 10-100 percent parasitism by *Apanteles congregatus* (a braconid). Controls were not applied. *Manduca* spp. were light on tobacco in Pittsylvania and Halifax Counties, VIRGINIA. Spray practices allowed very little damage.

BUDWORMS (*Heliothis* spp.) reached economic levels on tobacco in August and required controls in Prince Georges and Calvert Counties, MARYLAND. About 800 acres of tobacco were sprayed. Most growers were harvesting when the infestations peaked in late August and early September, so most fields were not sprayed. Heavy counts developed on secondary growth after harvest in Charles, Prince Georges, and Calvert Counties and provided a heavy overwintering population in these areas.

POTATO TUBERWORM (*Phthorimaea operculella*) infestations increased slightly over those of 1968 on tobacco in FLORIDA, but only light damage was noted.

GREEN PEACH APHID (*Myzus persicae*) was effectively controlled on most of the 33,000 acres in tobacco in MARYLAND by the use of a systemic insecticide. Populations in VIRGINIA steadily increased until August. Then moderate to severe damage occurred in Pittsylvania and Halifax Counties and in other parts of the southern Piedmont.

Several pests were of some concern on tobacco in VIRGINIA. Damage by DIFFERENTIAL GRASSHOPPER (*Melanoplus differentialis*) ranged moderate to severe in Washington, Scott, Russell, and Lee Counties following drought. TOBACCO THRIPS (*Frankliniella fusca*) stunted some plants in Pittsylvania and Halifax Counties, but economic damage was minor. Unspecified WIREWORMS caused light damage to tobacco in these counties as well as in other parts of the southern Piedmont, but were locally in the southwest part of the State. Damage in Washington County was the worst reported in several years.

SUGARBEETS

Highlights:

SUGAR-BEET ROOT MAGGOT was widespread in southern Idaho, and sugarbeet losses in Colorado were moderate. Controls were applied to about 15,000 acres in North Dakota. BEET ARMYWORM was a problem in sugarbeets in Oregon, California, and Arizona.

SUGAR-BEET ROOT MAGGOT (*Tetanops myopaeformis*) was known to be damaging in limited areas of Minidoka and Bingham Counties, IDAHO, prior to 1969. Infestations became more widespread this season in the southern area and were economically important in 12 southern counties. Larvae were collected June 6 and 13 from 3 Pleasant Valley fields where early instars scoured sugarbeet surfaces and cut off the tips of the young roots. This pest was present but apparently normal in UTAH. In COLORADO, sugar-beet root maggot infested sugarbeets in Weld, Larimer, and Boulder Counties and has possibly spread to Morgan County. Populations were moderate to heavy. Damage was heavy in many fields and losses were moderate. This pest increased in WYOMING. Adults were first noted in late May in Hot Springs County. Damage was heaviest in Park and Washakie Counties. Few controls were applied. First adults of the season in NORTH DAKOTA appeared in Pembina and Walsh Counties June 5. Emergence was prolonged for 6 weeks due to cold, cloudy weather. Peak fly emergence occurred about June 27. Maggots were found on June 20. Maggots ranged up to 100 (averaged 20) per root. About 15,000 acres were aerially sprayed 1-6 times with an inorganic phosphate. Most fields had a higher beet yield than last year.

SPINACH LEAF MINER (*Pegomya hyoscyami*) infested most sugarbeet fields throughout southern IDAHO early in growing season. In one field an average of 5 eggs per plant was recorded at Caldwell, Canyon County, May 13. This pest was common and at normal levels in UTAH. Injury in WYOMING was common but noneconomic. Adults were first noted in late May in Goshen County.

WESTERN YELLOW-STRIPED ARMYWORM (*Prodenia praefica*) larvae damaged sugarbeets in WASHINGTON. BEET ARMYWORM (*Spodoptera exigua*) larvae damaged seed plants in OREGON near Central Point, Jackson County. In mid-September larvae infested 10-20 percent of about 100 acres of 1 to 3-inch sugarbeet seedlings. Control was difficult. This species was a major pest of sugarbeets in CALIFORNIA. Larvae of this noctuid damaged young seedlings from late September into mid-October in ARIZONA. Up to 3 treatments were applied in Maricopa and Pinal Counties. PALE WESTERN CUTWORM (*Agrotis orthogonia*) infestations resulted in retreatment and replanting of some sugarbeet fields in Goshen and Platte Counties, WYOMING.

WEBWORMS (*Loxostege* spp.) damaged sugarbeets in Scotts Bluff County, NEBRASKA. Egg hatch was observed June 10, but larval development was delayed by cold weather in mid-June. Damage continued into July. BEET WEBWORM (*L. sticticalis*) larvae were heavy throughout eastern COLORADO. Damage was light, except in a few isolated fields where controls were applied. *Loxostege* spp. infestations were light in UTAH this season.

A CARRION BEETLE (*Silpha bituberosa*) larvae and adults damaged some sugarbeets in Hot Springs, Park, and Washakie Counties, WYOMING, in late May. Controls were effective, but some fields had to be replanted.

WESTERN BLACK FLEA BEETLE (*Phyllotreta pusilla*) was found in damaging populations during early May in Pasadena Basin near Glenns Ferry, Elmore County, IDAHO.

GREEN PEACH APHID (*Myzus persicae*) winged adults were first found on sugarbeets in IDAHO on May 13 at Marsing, Owyhee County. The incidence of beet yellows was much greater than in 1969. This aphid was common on this crop in UTAH. Green peach aphid was very prevalent on sugarbeets in CALIFORNIA and caused some damage. Beet yellows was not so heavy as in 1968. This aphid required controls in Curry County, NEW MEXICO.

BEAN APHID (*Aphis fabae*) counts on sugarbeets in Saginaw and Bay Counties, MICHIGAN, were high. *Empusa* fungus kept populations in check. SUGAR- BEET ROOT APHID (*Pemphigus populivenae*) infestations were apparently normal in UTAH.

MISCELLANEOUS FIELD CROPS

Larvae of BANDED SUNFLOWER MOTH (*Phalonia hospes*) and SUNFLOWER MOTH (*Homoeosoma electellum*) in NORTH DAKOTA ranged up to 47 (averaged 2.4) per head on sunflowers in Cass, Grand Forks, Steele, and Traill Counties. Larvae infested half of the heads in 95 percent of the fields. Banded sunflower moth comprised 95 percent of the larval population. *H. electellum* moths were detected in most sunflower-growing regions of TEXAS during 1969. Larvae ranged light to heavy throughout the central area, and moderate to heavy on the High Plains in mid-August.

Larvae and pupae of a MINT FLEA BEETLE (*Longitarsus waterhousei*) in WASHINGTON were noted in a 50-acre field June 16 at Kelso, Cowlitz County. SUNFLOWER BEETLE (*Zygogramma exclamationis*) in NORTH DAKOTA lightly infested sunflowers in Cass, Steele, Traill, Grand Forks, Walsh, and Pembina Counties. By July 11, up to 7 adults per 100 plants were present. By July 25, up to 5 larvae per plant were present. WIREWORMS damaged sunflowers in Wilkin County, MINNESOTA. Damage ranged from stand reduction to completely destroyed fields. All damaged fields had been in sod or soil bank before 1969. Heavy numbers of CARROT BEETLE (*Bothynus gibbosus*) damaged sunflowers in Lubbock County, TEXAS, in mid-August.

LYGUS BUGS (*Lygus* spp.) damaged safflower plantings and were more general than previously in CALIFORNIA. *Lygus elisus*, *L. hesperus* and *Lygus* spp. were unusually numerous on sunflowers in UTAH during late summer.

GRASSHOPPERS caused much damage to 500 acres of peppermint near Longview, Cowlitz County, WASHINGTON, in June. TWO-SPOTTED SPIDER MITE (*Tetranychus urticae*) severely damaged 80 acres of hops near Satus, Yakima County, on June 6. This is the earliest heavy infestation in 5 years in WASHINGTON.

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Part XXVI

Additional copies of Parts I through XXVI of this bibliography are available from Economic Insect Survey and Detection.

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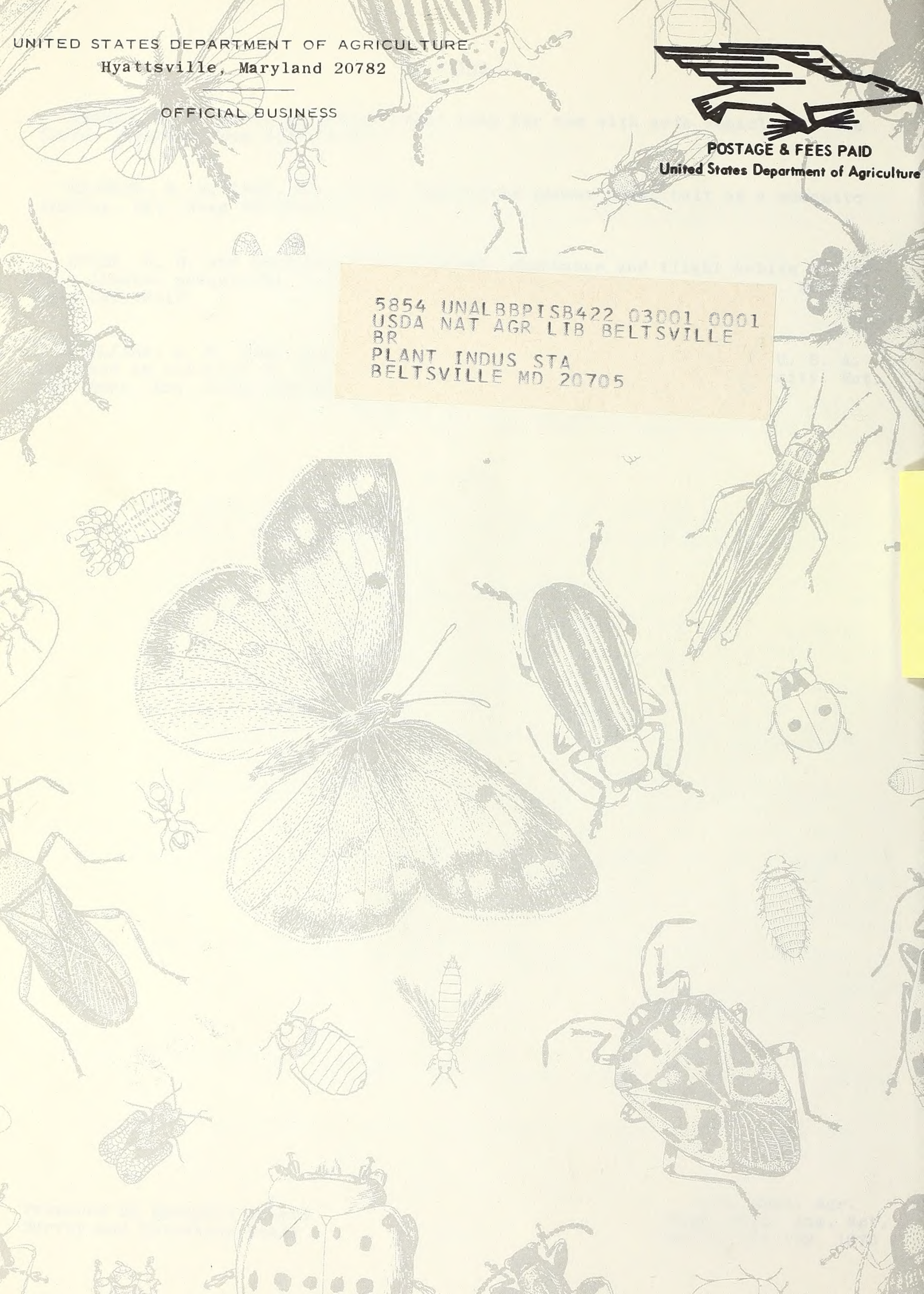

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